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Government
Publications

TORONTO AIRPORT LOCATION
PROPOSED MALTON EXPANSION

(Confidential)

MUNICIPAL PLANNING CONSULTANTS CO. LTD.	
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SUMMARY

At mid-year 1968 a federal-provincial technical team was assembled from within the various governments to investigate a number of airport sites for a major airport facility external to the present International Airport at Malton. Subsequent to the formation of this task force, a number of detailed studies were conducted at four primary external sites. The results of these studies are included in the present report in the form of an appendix.

The analysis of the four primary sites indicated that there were substantial cost implications to moving the future air traffic expected to be generated in the Toronto-Centered Region. The total costs associated with these external sites varied somewhat about an average of 3 billion dollars (present value costs) or approximately 6 billion dollars (constant dollar costs). The variability of costs among the four sites cannot be considered significant with the exception of site C (west of Toronto). The costs associated with site C are significantly lower than those at any of the other external sites (approximately 500 million dollars (discounted dollars)). Site C however does not conform to the regional planning programs of the Government of Ontario.

Review of Capabilities at Existing Site

The magnitude of the costs associated with these external sites was viewed with substantial concern among the various governments and led to an investigation of the

feasibility of expanding the present site at Malton to accommodate the future traffic in the Toronto region. The feasibility study was to include three major criteria:

- (a) the capability of the present site to physically handle all expected traffic during the planning period without any expansion of the existing noise lands;
- (b) the costs associated with the expanded facility throughout the design period and including those costs associated with alleviating the social disruption in the residential areas currently surrounding the present facility;
- (c) the degree to which the current site at an expanded level of activity could conform to, assist in and reinforce the development of, the Toronto-Centred Regional plan as defined by the Government of Ontario.

CONCLUSIONS

The examination of the capabilities of the present facilities showed that

- (a) the present facility could be expanded to accommodate all air traffic expected to the year 2000.
- (b) the ground transportation facilities could not handle the traffic generated by such an airport

unless a change was made in the methods of handling passengers to and from the airport. A system of mini-terminals connected by a rapid transit system integrated with the transit system required for the expected urban and regional growth during this period was developed and included in the costs associated with this proposal. It is anticipated that the major parts of this system would be required to accommodate the growth anticipated in the Toronto-Centered plan.

- (c) the costs associated with this proposal range from 35 per cent to 65 per cent below the cost levels associated with the external sites. The saving in expenditures inherent in this proposal approximates 1.1 billion dollars (present value). The savings in primary capital costs alone are 400 million dollars.
- (d) the proposal to expand the existing facilities will not completely disrupt the regional development concept for the Toronto-Centered Region but will call forth a whole new set of staging and increased public controls to insure the plan's implementation.

The expansion of the existing facility so as to be compatible with the planning concept will require:

- (a) a strong provincial control of the provision of all hard services in the western corridor,

- (b) a high degree of control over land zoning and subdivision approvals to maintain existing population targets,
- (c) an acceleration of the staging priorities for development of new urban nodes within the western corridor,
- (d) an earlier establishment of a region-wide transit system and a co-ordinated approach to passenger handling and the rapid transit system (i.e. mini-terminals and development of high technology transit modes).
- (e) a concentrated effort to direct other stimulus to develop the eastern corridor and to establish a number of mini-terminals and freight consolidation terminals in the eastern corridor.

It is clear that the economic effect of the airport can be spatially distributed throughout the Toronto-Centered Region. However, this will necessitate an acceleration of investment in infra-structure in the western corridor and a strong degree of control over the provision of these public services.

The development of the airport at its present site will eliminate an opportunity to utilize public investment to accomplish a self-sustaining impetus to eastern development. A co-ordinated effort would have to be directed to place other stimuli in this area. It would be appropriate that both levels

of government co-ordinate their investment opportunities to accomplish this goal; this may be one factor for inter-governmental negotiations if the proposal to expand the existing facilities is accepted rather than locating the airport to an external site.

INTRODUCTION

This study embraces the economic and social effects of a possible expansion of the current international airport, at Malton, to handle all commercial air traffic up until the year 2000. This study should be viewed as an appendix to the earlier studies that have been carried out in which four external sites were clinically evaluated. The study of the possibility of expanding the existing facilities was desired because of the large burden of costs associated with constructing a second international airport.

The social and economic factors involved in the airport expansion must be viewed in a particular framework of policy options and these options, of course, will condition the merits of one alternative versus the others, over and above the cost considerations. The examination of the possible expansion of Malton cannot be conducted in exactly the same manner as was carried out for the four external sites. The geographic position of the existing facilities is considerably different from that of any of the proposed sites, that is;

- (a) Malton is located in the midst of a highly developed urban area,
- (b) the growth rate of the surrounding environs is the most rapid in South-western Ontario,
- (c) the requirements for urban land in

alternative uses is largest in this area,

- (d) the political history of the expansion of this site is such as to suggest that further encroachment on urban land, further increases in noise and air pollution and further risk of safety hazards is socially unacceptable in this area.

All of the above have led to the acceptance by the study team of the following policy constraints:

- (i) the alternative of a Malton expansion must provide for sufficient facilities to service all potential demands up until the year 2000 without:
 - (a) requiring any additional urban land over and above that already committed to the airport facility,
 - (b) the factors of noise inherent in the current noise contours at a 100 C.N.R. rating, must not be increased as a result of this expansion,
 - (c) the effects of air pollution must be able to be contained within the present noise lands of the airport,

- (ii) to alleviate any undesirable social effects of the expansion of this facility, the Federal Government must agree to purchase any property within the defined noise lands at existing market value, if the owner desires to sell. This land may only be returned to productive capacity in a land use that is compatible with the existence of the expanded airport facility,
- (iii) all ground transportation facilities utilized to serve the airport must be integrated with the municipal, regional or provincial ground transportation systems. There will be no exclusive rights-of-way reserved for the airport access requirements. An exception to this would only occur where an exclusive right-of-way was reserved within a particular transportation corridor.
- (iv) operations of the airport and associated terminal facilities should be such that they distribute the economic and social effects of this investment and activity in an appropriate spatial distribution, compatible with provincial and regional planning. Pricing policies for cargo handling, parking and other user-oriented

PART I

The Economic and Social Impact
of
The Potential Malton Expansion

DEFINITION OF IMPACT PARAMETERS

The expansion of the existing facilities at the present Toronto International airport will contribute significantly to the economic growth within the Toronto region. The growth of the airport will produce economic and social effects in the form of:

- (a) employment - both directly in the airport and related activities and in ancillary service employment.
- (b) capital - the airport and ancillary facilities will create substantial capital formation throughout the region. This investment will take the form of roads and transit services; terminals and runway construction, water and sewage service and community infrastructure for the expanded labour force and population base.
- (c) spatial effects - the allocation of the capital expenditures geographically will alter not only the magnitude of the investment and labour force committed to the airport expansion, but it will condition the form and amount of growth of particular areas within the Toronto-centred region.

(d) environmental and safety effects - It is anticipated that these effects will not be any greater than those incurred by the existence of the present facility at Malton. The policy constraints for the expansion of Malton set out in the beginning of this report have been established so as to minimize the safety and environmental effects. Noise and pollution factors will not be allowed to increase and therefore this criteria will be taken to be equal to those at the existing facilities.

Treatment of Income Multipliers As can be seen from the cost estimates (capital and operating - see appendix), the amount of investment in both primary and ancillary facilities varies significantly for each airport site. In addition, the employment levels and, therefore, the net income additions created at each particular site will vary, also the productivity of each site in terms of cost borne by the users of the facility will be somewhat different. Differences will exist in the income flow to each site. However, the

amount of that income flow that will be reinvested in both consumption and capital goods to produce an increased level of consumer demand and, therefore, economic production cannot realistically be expected to be different for each of the sites that are under consideration.

The flow of money and the velocity of its circulation must be assumed to be fairly constant throughout the region. There may be some differences in the unused productive capacity existing in each area and, therefore, some greater acceleration of capital spending in one area versus the other; however, this must be extremely marginal, particularly as in most cases the region is accessible as a market to all producers located so as to supply the required goods and services.

It is suggested then that the income effects of each of the sites are to be found in the amount of capital that will be required in each site for primary and secondary infrastructure and that the income multiplier and acceleration effects are similar for each site. This assumption is not necessarily valid when it pertains to the magnitude of the employment multipliers for each particular site. The analysis presented below will then consider in detail the definition and effect of the employment and population multipliers but will exclude any analysis of an income multiplier.

DEFINITION OF THE IMPACT AREA

In the studies of the external airport sites "A", "B", "C" and "D", the impact area was defined as a 20-mile radius round the runway centres. It was observed in the earlier studies that some portion of the economic and social impact could be expected to fall within this impact area, and the remainder occurring within the Metro Toronto area. The alternative of expanding the current airport facilities provides an overlap of the basic impact area, i.e., 20-mile radius round runway centres within the Toronto Metropolitan area. It is likely, then, that the magnitude of the economic and social impact will be larger within the defined impact area, as this also includes the employment opportunities within the Metro centre.

The defined impact area is roughly triangular in shape, extending into the North-west due to existing road patterns. The Northern boundary is located in the Albion/Caledon E. area, while the Western boundary is in Milton/Oakville area. Thornhill and Agincourt form the Eastern boundary and Lake Ontario

shoreline the Southern boundary. It is highly probable that this impact area will be significantly altered by two factors:

- (a) The implementation of the Toronto-centred regional plan.
- (b) The provision of major transportation linkages between centres.

The accompanying map shows the distribution of home addresses of airport employees in 1969. The data zones are not political divisions, but those used by the D.H.O. in their TARMS work (Toronto area regional model study). The major concentrations of employees by municipality are:

Etobicoke	25.52
Mississauga	15.08
Chinguacousy	12.95
Toronto (core area)	4.17

Despite the high level of access by highway corridors (401, 400, Q.E.W.) over 50% of the employees reside within 10 miles of the airport, and over 90% reside within a 20-mile radius of the airport. If trend population growth is to occur at the same rate, then it appears that any future expansion of Malton will have the most significant impact within a relatively small geographical area. This would indicate that



DISTRIBUTION OF AIRPORT
EMPLOYEES BY HOME
ADDRESS, 1969

(SURVEY RECORDS):

TOTAL = 3429

15000 1.5

TRAFFIC PLANNING STUDIES
OFFICE, T.H.O.
2000 - 1500, 1500, 1500
1969 AIRPORT TRANSPORTATION SURVEY
CAN, July 1970

very precise planning and land-use control, as envisaged within the Toronto-centred regional planning report, would have to be co-ordinated with this expansion.

Employment and Population

Based upon the projections of air travel, the expansion of the Malton facility will create 53,522 basic jobs by the year 2,000, and an additional 37,465 non-basic jobs. The following tables outline the employment impact expected at various stages of the proposed expansion.

The population impact, consistent with the expected levels of increased employment, will produce an additional 112,000 people by the year 1990, and an additional 273,000 people by the year 2000. As will be seen below, all of this population impact is unlikely to occur within the primary or defined impact area.

The exact distribution of the increased population levels will be dependent upon the planning measures utilised by the various levels of Government in implementing the Toronto-centred regional plan, and on the format that is accepted for handling passengers and cargo to the new airport, e.g., external terminals and external freight consolidation terminals, would distribute the population and employment impact over a much greater area.

TABLE 1

EMPLOYMENT IMPACT
(Basic and Non-basic)

Yr.	Basic Airport & Related	Change over 1970	<u>Non-basic</u>			
			Multiplier of Basic to *			
			<u>Non-basic Jobs</u>			
			@ 0.7	@ 0.8	@ 1.0	@ 1.2
1970	12,325	-	8,628	9,860	12,325	14,790
1975	15,430	3,105	10,801	12,344	15,430	18,516
1980	18,387	6,062	12,871	14,710	18,387	22,064
1985	25,338	13,013	17,737	20,270	25,338	30,406
1990	34,465	22,140	24,126	27,572	34,465	41,358
2000	65,847	53,522	46,093	52,678	65,847	79,016

* The basic multiplier used in the analysis in this report is 0.7. The other multipliers are presented so that the reader may gain an appreciation of the sensitivity of the employment and population impact to the choice of the multiplier.

EMPLOYMENT IMPACT
(Total)

Employment Multiplier of Basic
to Non-basic Jobs

Yr.	@ 0.7	@ 0.8	@ 1.0	@ 1.2
1970	21,000	22,000	25,000	27,000
1975	26,000	30,000	31,000	34,000
1980	31,000	33,000	37,000	40,000
1985	43,000	46,000	51,000	56,000
1990	59,000	62,000	69,000	76,000
2000	112,000	119,000	132,000	145,000

When the general dependency ratio of 3:1 is applied to Table 1B, the resultant future populations arise:

TABLE 2

Population

Yr.	@ 0.7	@ 0.8	@ 1.0	@ 1.2
1970	63,000	67,000	74,000	81,000
1975	79,000	89,000	93,000	102,000
1980	94,000	100,000	110,000	121,000
1985	129,000	137,000	152,000	167,000
1990	175,000	183,000	207,000	227,000
2000	336,000	356,000	395,000	435,000
1990 (less 1970)	112,000	117,000	133,000	146,000
2000 (less 1970)	273,000	289,000	321,000	353,000

Multiplier Analysis

In deriving the levels of increased employment and increased population, the employment and dependancy multipliers are crucial factors in the analysis. The multiplier of 0.7 has been chosen as the most likely multiplier for the following reasons:

In comparison with the external sites where;

"In general, a 1:1 ratio with the Basic Complex has been used to determine the size of the community-based employment.

A slightly smaller multiplier seemed more reasonable, however, for the two sites with already well developed urban centres and services - - sites B and C.

Moreover, it was felt that Site C, in conjunction with the Guelph/Waterloo/Kitchener urban complex would take on more of the service functions from within its own tertiary sector than would Oshawa from site "B".

The accepted multipliers in the former analysis were:

Site A	1.00
Site B	0.9
Site C	0.8
Site D	1.00

If an effective comparison is made with the earlier multipliers, it would appear that the

levels of service and tertiary activities within the Toronto-metropolitan area is significantly greater than that in any of the existing communities involved in the analysis of the other external sites. The table on the following page will indicate the relationships between the various communities involved in the other site locations and metropolitan-Toronto area. For this reason alone, it would appear that the multiplier used for predicting the employment and population impacts associated with the expansion of Malton would be greatly reduced over that of the alternative site locations. An estimation of an appropriate multiplier would appear to be approximately 0.5.

In addition, the possibility, indeed the probability of incorporating external terminals and external freight consolidation terminals into the airport planning technique will further dilute the localized impact and should, therefore, produce an even lower multiplier.

It is estimated that approximately 15% of the passenger and baggage handling related employment could be removed from the main airport terminal site and relocated elsewhere within the region. This analysis would indicate that the multiplier for employment impact should be something less than 0.5. However, the earlier

TABLE 3

RELATIVE IMPACT OF AIRPORT COMPLEX
POPULATION ON IMPACT AREAS

	(1) "Normal" <u>Population</u>	(2) Airport Complex <u>Population</u>	(3) Relative Population <u>Impact</u>
A	101,100	142,500	1.41
B	397,900	136,200	0.34
C	710,410	128,000	0.18
D	37,700	142,500	3.78
Malton	4,000,000	400,000	0.10

Note:

Figures for A, B, C, D are 1990

Figures for Malton are 2000

studies on the alternative sites incorporated a situation whereby the localized impact area and the impact on the Metropolitan Toronto core area was geographically separate. It is considered that the multipliers attached to the other alternative sites are such as to take into account possible leakages of impact into the metropolitan area. Within each of the alternative sites, fairly significant portions of the total employment impact would not be located within a 20-mile radius of the airport site, but would rather be located in the downtown area in the form of ticketing, passengers, hotel and other commercial employment. If the alternative of expanding Malton is accepted, these leakages are repatriated into the local impact area.

For this reason it is argued that the multiplier on employment should be increased somewhat from 0.5. It is anticipated that a 40% increase in the multiplier would account for any repatriation of jobs that formerly escaped from the local impact area into the metropolitan core.

In this way, the multiplier which will be utilized in this analysis would be established at 0.7.

DEMANDS ON THE IMPACT AREA

The impact of a large new facility can be viewed in two ways; first, the actual size of the facility itself, as measured by any variety of standards; and secondly, the relative size of that facility and its accompaniment in comparison to its immediate environs. The five key measures of impact to be used here are population, employment, land use, capital and income. Expansion at Malton could have any of three effects on these measures:

- (1) A "multiplier effect", that is, it could serve to generate expansion of the region beyond its own contribution of jobs, investment, etc.
- (2) An "accelerator effect", that is, it could intensify, or speed up, the pace of development through its needs for capital or labour.
- (3) A "transforming effect", that is, it could change the structure of economic development through its introduction of new population or labour force components into the region.

A summary of the above effects on the five factors is given in Table 4 .

TABLE 4

Summary of Impact of Malton Expansion
on Economic Development of Toronto
Centered Region

	<u>Multiplies</u>	<u>Accelerates</u>	<u>Transforms</u>
Population	no	strongly	no
Employment	moderately	moderately	no
Capital investment	no	moderately	slightly
Income flow	moderately	strongly	no
Land development	no	strongly	no

We are presently concerned with the total of air operation requirements for the region rather than just the international segment, as was previously the case. Thus, the scale and impact of these operations will be somewhat larger than those anticipated for the other sites. The impact will be concentrated geographically in an already expanding area. Thus, to some extent, the growth in this area will be accelerated.

Population

If, by year 2000, we must expect a population of 195,000*

Without considering even the non-basic sector, then there will obviously be a strong accelerator effect on the population. However, since the region is already a metropolis, this significant input will not alter or transform its character; it will just build up to a maximum target level at a somewhat higher rate (see Table).

An index of "relative population impact", derived in our initial study and as shown above on Table 3 , is useful in two ways. First, a high index value suggests a multiplier effect on local population growth, while a low index suggests that there may not be the same significant effect on local population levels. Second, and the converse of the first, is that a low relative impact means the local area can absorb the new airport growth with greater ease on capital formation.

Employment

The previous report indicated that the airport has a multiplier effect on employment within its complex and, hence, on sectors such as the hotel, personal services and community services industries. This will continue, not only at the site, but possibly also in a wider area, dependent on the passenger volumes at the various collector terminals. It is conceivable that the larger and busier of these could generate some passenger service concentrations of their own.

* Basic Jobs of 65,000 x Population Dependency Ratio of 3:1

A moderate "accelerator effect" on labour rates and demands will accompany Malton expansion. This will be larger than the "slight" accelerator earlier called for, due to the consolidation of flight facilities.

Finally, as mentioned before, there are no special characteristics of the labour force associated with the airport complex. There will likely be no effect on the structure of the regional labour force.

Capital Investment

Although the cost for Malton expansion will be considerably less than that for construction of a totally new external site, the absolute amount of capital formation will be of significance to the total capital structure in the region.

Income Flow

Malton expansion will not stimulate any special income flows or characteristics since the area already receives heavy income flows from the present operations. However, if the anticipated gains in passenger rates materialize there will be a strong acceleration in total regional income, especially in the period 1990-2000, when the number of trips is expected to increase by 50 per cent.

Land Development

Land acquisition would not likely have to be near the magnitude of that required for land use control around a new site, especially if the noise lands remain constant or decrease in area. If the government adopts an open

the development policy for the
the area designed for approximately 663,000 persons
1985. If the residence patterns of 1969 hold constant,
roughly 12 per cent of the workers would reside in
this South Peel area. These 3,040 workers would create
a total population of 9,020. In addition, an associated
non-basic labour force of 2130 would come into existence
here with its attendant population of 6390. Thus, a
total of 15,410 persons could be expected on a pure
trends basis.

If, however, development of the whole area is to be
staged section by section, then the influxes could be
much higher. If no new trunk services are made available
in the prime residency areas of Chinguacousy, Etobicoke

and Toronto core, then the additional allocations for these areas would be attracted to the adequately serviced municipalities. This extra "shifted" group could amount to over 25,000 employees, bringing a total of 75,000 additional persons into the South Peel scheme.

AIRPORT EFFECT ON POPULATION
DISTRIBUTION (WESTERN CORRIDOR)

<u>DISTRICT NO.</u>	<u>ACTUAL 1970 POPULATIONS</u>	<u>TARGET POPULATION YEAR (2000)</u>	<u>TOTAL INCREASE AVAILABLE</u>
13	203,000	663,000	460,000
12	55,500	337,000	281,500
11	444,000	850,000	406,000
TOTAL	<u>702,500</u>	<u>1,850,000</u>	<u>1,147,500</u>

The Western corridor of Zone I, as embodied in the Toronto-centred region, has a growth potential of 1,147,500 persons by the year 2000. This level of population expansion will meet the targeted population levels at that year (as shown above).

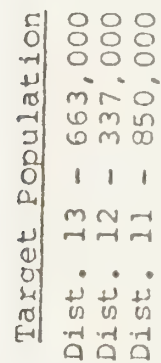
The employment effect of the airport expansion will be to increase the airport-based population from 62,800 in 1970 to 174,770 and 335,817 in 1990 and 2000 respectively. The expected increase in airport-related population during this time period will be:

1970 - 1990	-	112,000 persons
1970 - 2000	-	272,900 persons

The current distribution of this airport-related population is as shown in the following table. If the same percentage distribution of population location were to exist, in the year 2000, the Western corridor

1970 DISTRIBUTION OF AIRPORT AND RELATED EMPLOYEES

	<u>% of employees</u>
Metropolitan Toronto	62.4
District 13	24.6
District 12	2.7
District 11	<u>0.8</u>
TOTAL (West corridor)	<u>90.5</u>



NOTES ON THE
PUBLICATION OF
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NEW YORK DISTRICT MAP

DISTRIBUTION OF AIRPORT EMPLOYEES 1968

SAMPLE SIZE: 3429

ZONE NO	NO. OF EMPLOY- EES	% OF TOTAL	ZONE #	# OF EMPLOY- EES	% OF TOTAL	ZONE #	NO. OF EMPLOY- EES	% OF TOTAL	ZONE #	# OF EMPLOY- EES	% OF TOTAL
1	109	3.18	21	2	.06	41	82	2.39	61	1	.0.
2	100	2.92	22	2	.06	42	12	.35	62	0	(
3	60	1.75	23	6	.17	43	0	0	63	0	(
4	130	3.79	24	0	0	44	104	3.03	64	4	.1.
5	84	2.45	25	0	0	45	0	. 0	65	0	(
6	86	2.51	26	4	.12	46	6	.17	66	0	(
7	56	1.63	27	0	0	47	3	.09	67	0	(
8	148	4.32	28	21	.61	48	6	.17	68	0	(
9	310	9.04	29	7	.20	49	0	0	69	0	(
10	123	3.59	30	7	.20	50	0	0	70	0	(
11	67	1.95	31	20	.58	51	0	0	71	1	.0.
12	68	1.98	32	2	.06	52	0	0	72	7	.2.
13	124	3.62	33	27	.79	53	0	0	73	0	(
14	441	12.86	34	40	1.17	54	5	.15	74	2	.0.
15	51	1.49	35	143	4.17	55	0	0	75	0	(
16	54	1.57	36	444	12.95	56	0	0	76	0	(
17	13	.38	37	77	2.25	57	0	0	77	2	.0.
18	11	.32	38	320	9.33	58	0	0			
19	4	.12	39	1	.03	59	2	.06			
20	17	.50	40	13	.38	60	0	0			

could be expected to absorb 76,600 persons or 28.1 percent of the population increase due to the airport expansion. The increasing population pressures on the central core and the Metropolitan Toronto area are such that it is not practical to assume the same percentage population distributions for the year 2000 as occurred in 1970. Increasing pressure of higher densities and increasing service costs will direct the growth outward from the city core. The actual distribution of the airport population impact will depend upon the implementation of the regional planning proposals and the staging of the transportation and servicing facilities embodied in this regional plan for the Toronto-centred region.

It should be recognized that the growth in the Western corridor, in the past decade, has been influenced by the existence of the Malton Airport. The trend growth rates for this area include a component of growth from airport employment. Therefore, it is obvious that the selection of an airport site remote from the present site will depress the trend rates of growth in this corridor and assist in alleviating some of these population pressures. The expansion of the existing airport does not inject a new factor into the growth trend in this corridor; however, the removal of the population expansion implicit in a larger airport will assist in alleviating pressures in this corridor

and the subsequent placement of the second air facility in another region could be used to stimulate growth in that area.

If, however, the existing airport was to be expanded, the acceptance of this alternative would not disrupt the Toronto-centred Regional plan but would call forth a different set of alterations to accommodate this. The staging of the implementation of the Zone I plans may be accelerated in the Western corridor and other factors would have to be found for stimulating the Eastern corridor.

The above has indicated that the expansion of the current airport site does not detract from the Regional plan for the Toronto-centred area; however, the method of accommodating this expansion can have substantial implications for the implementation of the plan. The expansion of the existing airport facility leads to an increase in employment and population, staged as follows:

<u>YEAR</u>	<u>CHANGE IN EMPLOYMENT</u>	<u>CUMULATIVE CHANGE</u>	<u>CHANGE IN POPULATION</u>	<u>CUMULATIVE CHANGE</u>
1970-1975	5,278		15,837	
1976-1980	5,027	10,305	15,078	30,915*
1981-1985	11,817	22,122	35,451	66,366*
1986-1990	15,516	37,638	45,548	112,000
1991-2000	53,379	91,017	161,047	273,000

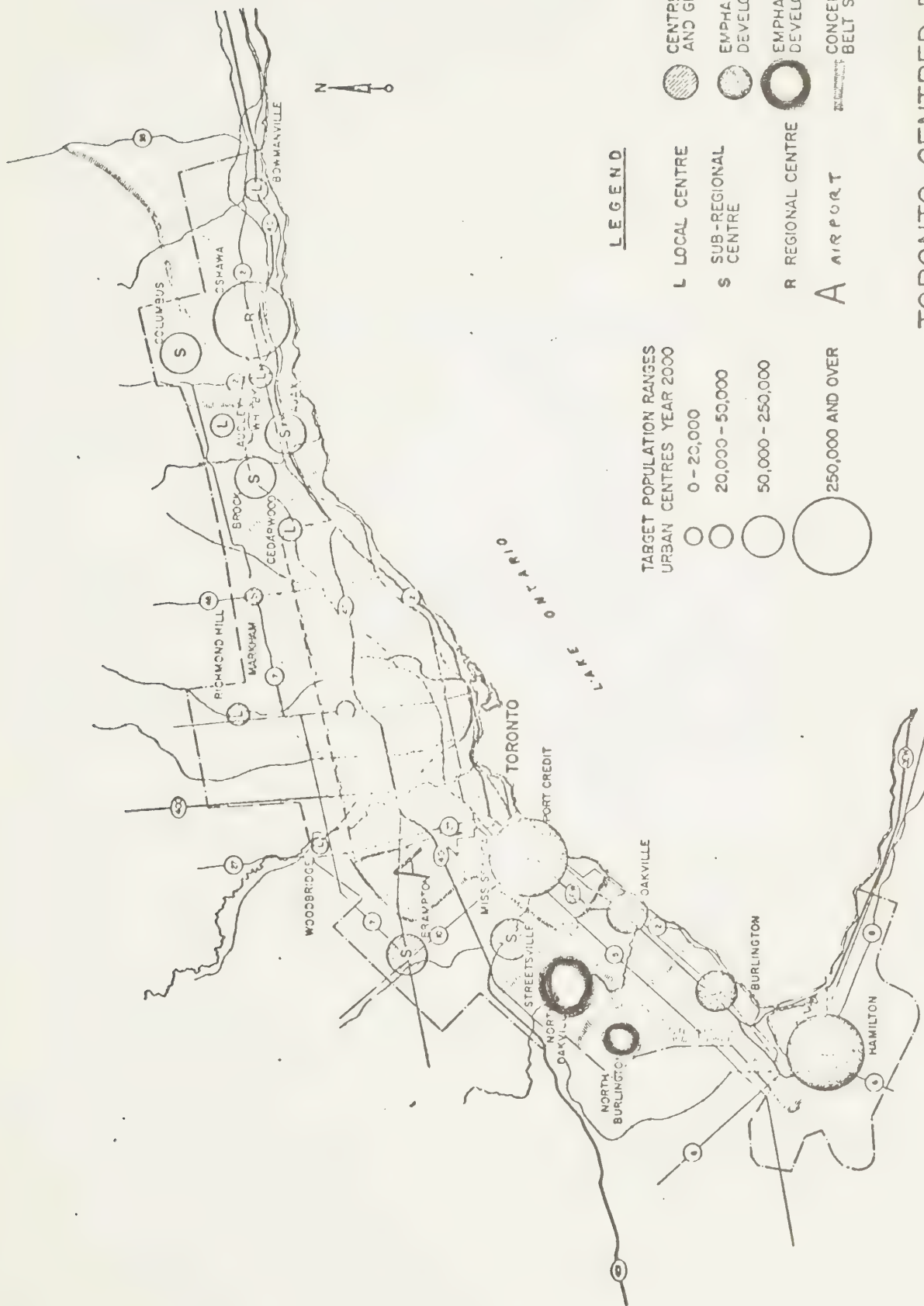
Corresponding changes in population for District 13 staged over the same period are approximately:

* see footnote of the following page

DISTRICT 13 TARGET POPULATIONS

	<u>POPULATION CHANGE</u>	<u>CUMULATIVE POPULATION CHANGE</u>
1970 - 1975)		
)	242,000	
1976 - 1980)		
1981 - 1985)		
)	130,000	372,000*
1986 - 1990)		
1990 - 2000	88,000	460,000

The above estimates indicate that the major impact of the expansion of the existing facility will occur during the period 1986 - 2000. The Toronto-Centred Regional Plan calls for the emphasis on the establishment of two new urban complexes in the Western corridor during this period, the first of these being North Oakville with an expected population of 50,000 - 250,000 people and the second being North Burlington with an expected population of 20,000 - 50,000 people. (See attached map.) If the median of this range is accepted as a target population of each centre, the additional population capacity would be 185,000 persons. It would appear that the growth of these two centres would be perfectly staged with the increase in population impact brought about by the expansion of the existing airport facility. In addition,



TORONTO-CENTRED REGION DEVELOPMENT CONCEPT FOR ZONE I

it should be pointed out that the proposed transportation concept that will be implemented between the years 1980-2000 will further distribute the impact of the expanded facility geographically.

POSSIBLE IMPACT OF EXPANDED MALTON COMPLEX

ON

REGIONAL PATTERNS AND POLICY

Impact of Development Patterns

- reinforces Western development thrust and will accelerate to some degree the growth of population in the Western area.

- will accelerate the utilization of any existing capacity.

Policy Requirements to Avoid Disruption

will require strong control of servicing and subdivision approvals to retain existing target levels of population by area.

will require control and co-ordination of the provision of "hard services" with population growth. This factor will be necessary at any rate; however, the pressure on existing plant and facilities will accelerate.

Impact of Development Patterns

- will place high demands on the local and arterial road systems for immediate airport area.

If an external site was chosen a portion of this demand pressure would move to an alternate location.

- will eliminate an opportunity to utilize public investment to accomplish an impetus to eastern development. The airport site in the eastern sector would provide a large accelerator effect in that area.

Policy Requirements to Minimize Disruption

will require an earlier establishment of a transit system to alleviate road pressure and supply an adequate level of service.

will require a coordinated approach to external terminal location and transit planning.

will require a concentrated effort to spatially place other stimuli in this sector, such as regional airports, major port facilities. the prospect of being able to spatially separate the various functions of the airport, such as external terminal facilities and external freight consolidation terminals will dilute some of these opportunity costs by dispersing geographically the effect of the airport.

PART II

Malton Expansion Cost Profile

MALTON EXPANSION COST PROFILE

The following table summarizes the cost components for the expansion of the existing facilities at Malton. The major categories of cost are similar to those produced for the external sites A, B, C, and D; however, there are not differences in the way each cost category is handled.

(A) PRIMARY CAPITAL COSTS

- land acquisition - the current plans call for no increase in the actual land consumed for the airport site itself. This is due to the placement of an additional runway "close in" to the existing 32-R-14L runway. This runway configuration plus an extension to runway 06L-22R can be possible with existing airport land.
- airport noise lands - the airport noise lands will be expanded. However, some cost estimates must be made to take into account the expenditures involved in purchasing those land owners' property that take advantage of the aforementioned offer to purchase. It is estimated that 10 per cent of the land under C.N.R. noise contours will accept the purchase offer and sell their property. It will be important that consideration be given to the allowable alternative use for this land.
- airport construction: these costs involve the construction of terminals and runways.

- airport operating and maintenance costs - These costs include the estimated total O&M costs at the airport based on a percentage of capital investment and include the estimated winter maintenance costs.
- ground transportation - estimated operation and maintenance cost for facilities shown in chapter on transportation system.
- servicing - These costs are estimated at 1% of the capital and thus are equal to $8.5 \times .01 = \$85,000$ (not shown)

SECONDARY COSTS:

Indirect User Costs - estimated time costs, at an average rate of \$1/hour, for airport users travelling between origin and/or destination and the airport.

Community development costs - in the initial studies community development costs were calculated as a function of the population increase expected in the impact area, multiplied by a constant amount of capital formation per resident/household, labour force, irrespective of the site location. Thus community development costs became a direct function of the employment multipliers. In the case of the proposed Malton expansion and in consideration of the Toronto-Centered Regional plan it is suggested that no additional community development costs will be incurred in respect of the proposed

The tables shown present -

- (i) costs for Malton expansion in constant dollars (not discounted)
- (ii) costs for internal airport sites A, B, C & D in constant dollars (not discounted)
- (iii) costs for external sites and Malton expansion discounted at 4% per annum.
- (iv) initial estimates of costs presented in the report to the policy committee of Cabinet on June 3, 1970.

Note - Ground transportation costs estimated to 1990 only.

Operation and Maintenance costs only include winter maintenance.

TABLE I

COST PROFILE - MALTON EXPANSION

- Assumed 1980 opening date
- Design year - 2000

(Millions of constant)
\$PRIMARY COSTS(a) Capital

(i) land acquisition

- noise lands	70.0
---------------	------

(ii) airport construction	327.8
---------------------------	-------

(iii) ground transportation	348.4
-----------------------------	-------

(iv) servicing

- airport	8.5
- noise lands	-
- impact area	-

Sub-total

754.7

(b) Operating

(i) noise lands	(63.0)
-----------------	--------

(ii) direct user costs	1,637.4
------------------------	---------

(iii) airport O & M	675.4
---------------------	-------

(iv) ground transportation	20.9
----------------------------	------

(v) servicing

Sub-total

2,270.7

Total primary costs

3,025.4

SECONDARY COSTS

Indirect user costs

664.8

TOTAL NET COSTS

3,690.2

TABLE II

TORONTO II AIRPORT - SITE EVALUATION COSTS (MILLIONS \$ CONSTANT)

(Design Year of 2000, Assumed 1980 Opening Date)

	<u>SITE A</u>	<u>SITE B</u>	<u>SITE C</u>	<u>SITE D</u>
<u>Primary Costs</u>				
a) Capital				
(i) Land Acquisition				
- Airport	62.10	26.39	32.06	20.16
- Noise lands	147.90	57.93	115.48	75.90
(ii) Airport Construction				
- Toronto II	487.30	548.10	526.00	503.60
- Malton	104.90	104.90	104.90	104.90
(iii) Ground Transportation	431.60	439.50	361.80	440.30
(iv) Servicing				
- Airport	13.00	11.56	13.78	22.64
- Noise Lands	14.00	53.00	78.54	8.50
- Impact Area	64.54	41.59	80.42	109.48
Sub-total	<u>1,327.34</u>	<u>1,282.97</u>	<u>1,312.98</u>	<u>1,285.48</u>
b) Operating				
(i) Noise Lands Management	(187.00)	(193.00)	(356.14)	(47.40)
(ii) Direct User Costs	2,931.70	3,064.50	2,123.30	2,756.80
(iii) Airport O & M	1,032.40	1,123.20	1,081.40	1,055.50
(iv) Ground Transportation O & M	270.40	270.10	239.70	312.10
(v) Servicing O & M	11.78	14.19	23.84	17.70
Sub-total	<u>4,059.28</u>	<u>4,278.99</u>	<u>3,112.10</u>	<u>4,094.70</u>
<u>Total Primary Costs</u>	<u>5,386.62</u>	<u>5,561.96</u>	<u>4,425.08</u>	<u>5,380.18</u>
<u>Secondary Costs</u>				
Indirect User Costs	<u>1,412.00</u>	<u>1,467.80</u>	<u>1,080.00</u>	<u>1,390.10</u>
<u>TOTAL NET COSTS</u>	<u>6,798.62</u>	<u>7,029.76</u>	<u>5,505.08</u>	<u>6,770.28</u>

NOTES: () Negative Cost

For detailed description of each criteria
refer to Section IV C

Source documents - See Appendix G

TABLE III

TORONTO II AIRPORT - SITE EVALUATION COSTS

(Millions \$ Discounted)

(Design year 2000, Assumed 1980 opening date
discounted at 4% per annum)

PRIMARY COSTS	Site A	Site B	Site C	Site D	Malton
a) Capital					
(i) Land acquisition					
- airport	58.59	24.90	30.25	19.02	-
- noise lands	139.54	54.19	108.96	71.61	66.05
(ii) Airport construction					
- Toronto II	268.40	314.00	297.50	280.30	-
- Malton	93.30	93.30	93.30	93.30	200.70
(iii) Ground transportation	266.35	286.95	237.06	277.80	199.60
(iv) Servicing					
- airport	9.95	7.93	9.28	15.62	3.0
- noise lands	6.93	23.00	33.60	5.40	-
- impact area	43.33	25.24	54.64	69.70	-
Sub Total	886.39	829.51	863.59	832.75	469.35
b) Operating					
(i) Noise lands mgt.	(146.90)	(99.00)	(182.20)	(31.80)	(59.40)
(ii) Direct User costs	1,223.28	1,279.67	885.14	1,149.35	679.00
(iii) Airport O & M	499.26	542.42	522.55	510.14	339.00
(iv) Ground transportation O & M	116.10	114.61	102.07	136.35	9.45
(v) Servicing O & M	6.5	7.24	13.09	11.27	-
Sub Total	1,698.24	1,844.94	1,340.65	1,775.31	968.05
TOTAL PRIMARY	2,584.63	2,674.45	2,204.24	2,608.06	1,437.40
SECONDARY					
Indirect User Costs	597.82	621.51	457.19	588.32	281.90
TOTAL NET COSTS	3,182.45	3,295.96	2,661.43	3,196.38	1,719.30

TABLE IV

TORONTO II - INTERNATIONAL AIRPORT

COST PROFILE
INITIAL ESTIMATE

Assumed - 4 per cent discount rate
- 1980 opening date

<u>Primary Costs</u>	<u>Site A</u>	<u>Site B</u>	<u>Site C</u>	<u>Site D</u>
1) <u>Primary Capital Costs</u>				
Land Acquisition				
Airport	62.10	24.30	32.06	17.77
Noise Lands	212.47	114.24	176.52	79.70
Airport Construction	260.77	304.48	288.52	272.10
<u>Sub-total</u>	<u>535.34</u>	<u>443.02</u>	<u>497.10</u>	<u>369.57</u>
Ground Transportation	129.15	149.75	99.86	140.60
Trunk Servicing	56.33	36.49	65.95	83.40
<u>Sub-total *</u>	<u>185.48</u>	<u>186.24</u>	<u>165.81</u>	<u>224.00</u>
<u>Primary Capital Costs (Total)</u>	<u>720.82</u>	<u>629.26</u>	<u>662.91</u>	<u>593.57</u>
2) <u>Primary Operating</u>				
Noise Land Management	(218.08)	(107.50)	(178.99)	(66.73)
Airport O & M	15.06	13.22	9.55	14.14
<u>Sub-total</u>	<u>(203.02)</u>	<u>(94.28)</u>	<u>(169.44)</u>	<u>(52.59)</u>
Ground Transportation				
O & M	106.65	105.16	92.62	126.90
Servicing O & M	8.21	5.04	9.59	12.73
<u>Sub-total *</u>	<u>114.86</u>	<u>110.20</u>	<u>102.21</u>	<u>139.63</u>
3) <u>Primary User Costs</u>				
<u>Direct User Costs</u>	<u>1,223.28</u>	<u>1,279.67</u>	<u>855.14</u>	<u>1,149.35</u>
<u>Total Primary Costs</u>	<u>1,855.94</u>	<u>1,924.85</u>	<u>1,480.82</u>	<u>1,829.96</u>
<u>Secondary Costs (Capital)</u>				
Community Development				
Costs *	880.50	733.80	874.30	870.40
<u>Secondary Costs (Operating)</u>				
<u>Indirect User Costs</u>	<u>597.82</u>	<u>621.51</u>	<u>457.19</u>	<u>588.32</u>
<u>Total Secondary Costs</u>	<u>1,486.32</u>	<u>1,355.31</u>	<u>1,331.49</u>	<u>1,458.72</u>
<u>Total Net Costs</u>	<u>3,342.26</u>	<u>3,280.16</u>	<u>2,812.31</u>	<u>3,288.68</u>

PART III

The Transportation System

THE TRANSPORTATION SYSTEM

The Toronto-centred Region plan suggested that the transportation facilities provided for the region, "must reflect the development concept," that it "must stimulate the concept's pattern of urban centres as well as the land uses." As the airport facilities that are planned for the next 20-30 years are vital components of the region's transportation structure, it must also reflect the region's development concept. The airport facility has the usual characteristics of a large center of production activity in that the determination of this investment's spatial character will determine the spatial structuring of many other transportation investments. The airport's function of concentrating sub-trip origins and destinations requires that a high level of access be provided for an effective and efficient interchange of passengers and cargo between the various modal components of their trip.

The analysis of the ground transportation system to service an expanded Malton airport has been subject to two constraints, namely;

(a) that due to the fact that the "airport generated traffic", while sizeable in absolute volume, will continue to be a small part of the total urban movement of goods and people, there can be no urban corridors reserved exclusively for servicing the airport traffic. The network of highways and rapid transit services used for airport access must be integrated with that network used to service the urban area;

(b) that there is a definite upward limit in the amount of land that can be consumed in providing transportation services. This constraint then suggests that the current highway plans, as envisaged by D.H.O., cannot be greatly expanded so as to add multiple lanes to existing 8 - 12 lane freeways. The transportation system will then require some form of high performance transit service.

Given these two constraints and the estimated volume of traffic ("approximately 32,000 vehicles would require egress from the site in one hour (peak outbound)"), the consultants and D.H.O. have concluded that "...There is absolutely no possibility that this amount of road traffic can be adequately provided for..."

The consultants then suggest that a series of off-site terminals be utilized to decentralize the traffic demands of a centralized airport. The attached maps show two transportation systems as proposed by (a) Department of Highways for Ontario and,

(b) the consultants for the Federal planning team.

These off-site terminals with full capability for processing the air passenger will have the effect of spatially distributing the effect of the airport throughout a wider area of the Toronto-centred region. These off-site terminals will be connected to the central air landing facility by means of transit vehicles operating in an exclusive transit right-of-way. The consultants in accord with our earlier policy statement, suggest:

"All of the busways follow existing or proposed freeway routes so that medians can be utilized, or are on Hydro rights-of-way. Land costs (and also construction costs to a large degree) are therefore minimal. These busways would be physically separated

from other traffic and would allow high speed operation by buses or vehicles hauling cargo (like the proposals for the alternative sites for Toronto Airport II).

"It is envisaged that both passengers and cargo would be brought to the remote terminals where they would be transferred to airport buses or special cargo trucks and delivered to (or from) the proper gate at the airport. In the case of remote terminals which are on Metropolitan rapid transit lines it would be essential to have these as processing terminals, so that passengers would not have to transfer with baggage. At the other terminals this would be optional but still desirable. (In order for the system to work adequately we have had to assume that certain new arrangements could be made for customs inspection and baggage handling). One thousand parking spaces have been assumed at each remote terminal (except for 1 and 14 where none would be provided).

"Within the airport property the rapid transit vehicles (buses) are assumed to operate on the same roadways as other traffic. The system within the property can be designed to allow free flow. This has the advantage of allowing the buses to deliver or pick up passengers at or close to the aircraft gate, or allowing cargo vehicles to go directly into the cargo area. A cost has been included for special ramps and roadways required by the rapid transit vehicles.

"The first busway is shown for 1980 between the Islington Subway terminal and the airport. This follows a Hydro right-of-way for most of its length. The second stage (1990) would be a busway from approximately Highway 48 (Markham Road) along a Hydro right-of-way to Malton. The third stage is speculative, but may be necessary if the urban development foreseen in the Toronto-Centred Region plan of the Province materializes."

Table 4 shows the proposed transportation system to service the immediate airport environs.

The concept of "mini terminals" embodied in this proposal has been suggested for a number of airports in the U.S.A.

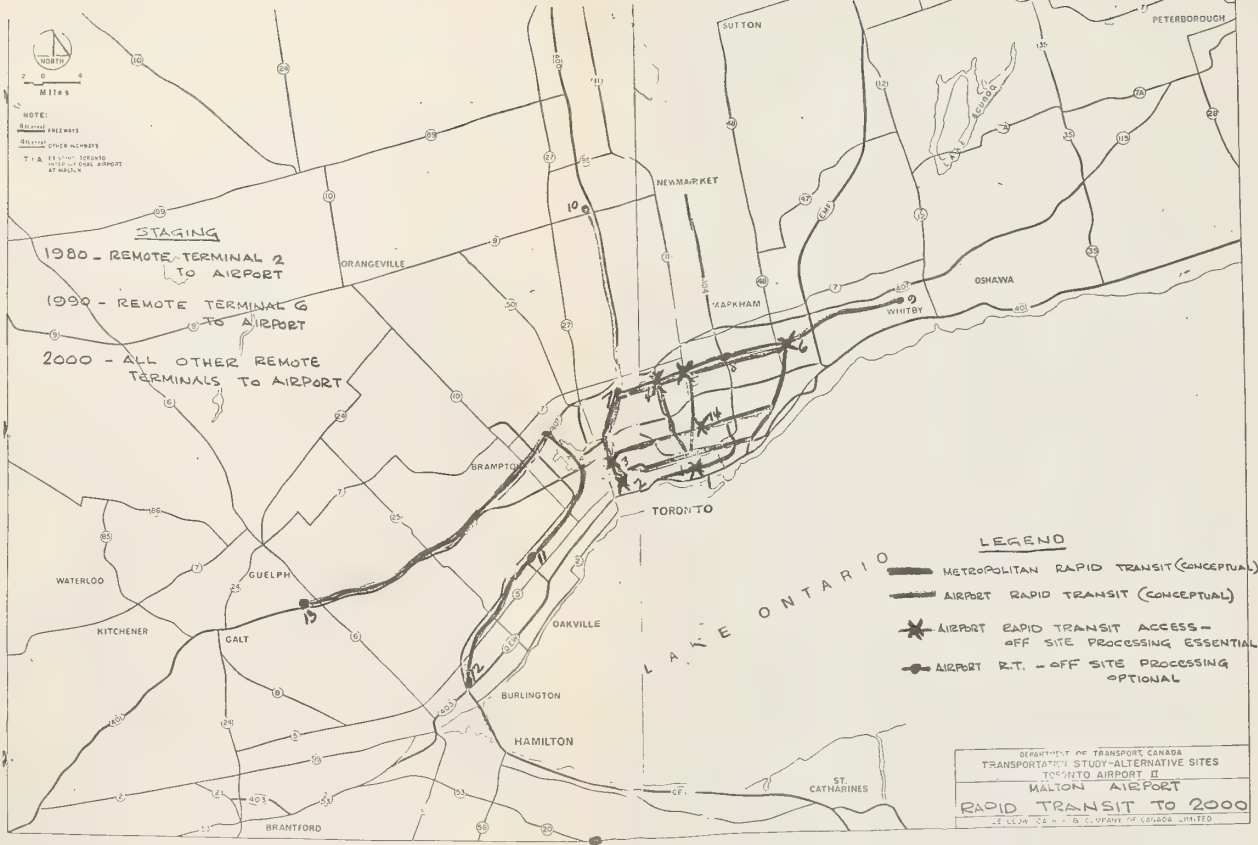
This concept will require the co-ordination of:

- (a) taxi and limousine service to each such terminal.

- (b) parking prices between the sub-terminals and the air port.

- (c) transit fares for rapid transit to airport; so as to encourage airport users to access the airport site via the sub-terminal and the rapid transit system.

The implementation of this concept will spatially distribute the economic and regional effects of the airport employment. The most pessimistic estimate is that 15% of airport jobs (direct employment) will be distributed to these sub-terminals. This effect will be furthered through the integration of the air cargo traffic with the passenger sub-terminal. The following tables show the expected increases in air cargo traffic and the resultant estimates of vehicles that would otherwise be required to service the outbound air cargo in 1990.



CONCEPT 1
TRANSIT SYSTEM SERVING
MALTON AIRPORT DIRECTLY
IN THE YEAR 2000

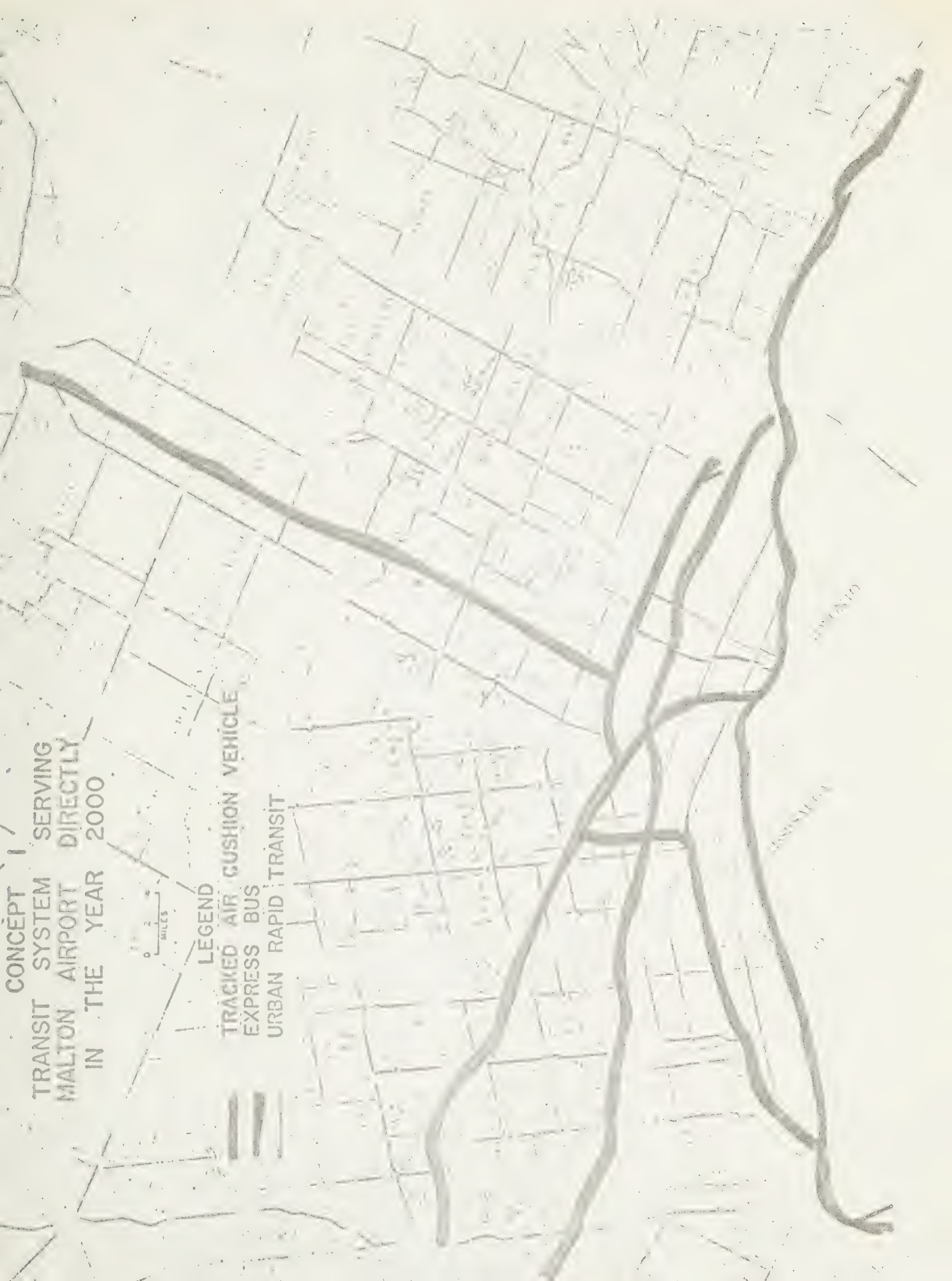
0 2
MILES

LEGEND

TRACKED AIR CUSHION VEHICLE

EXPRESS BUS

URBAN RAPID TRANSIT



CONCEPT II
TRANSIT SYSTEM SERVING MALTON
AIRPORT VIA SATELLITE TERMINALS
IN THE YEAR 2000

0 2 4
MILES

LEGEND

TRACKED AIR CUSHION VEHICLE
LESS BUS

HIGH SPEED DIRECT LINK TO AIRPORT
SATELLITE TERMINALS



CONCEPT II

TRANSIT SYSTEM SERVING MALTON
AIRPORT VIA SATELLITE TERMINALS
IN THE YEAR 2000

0 2 4
MILES

LEGEND

TRACKED AIR CUSHION VEHICLE

SS BUS

SATELLITE TERMINALS
HIGH SPEED DIRECT LINK TO AIRPORT



APPENDIX

The following graph shows the reduction in noise lands at the present airport site if an additional airport (external site) is selected in combination with Malton. The reduction of noise lands is a positive benefit if an external site is chosen; however no additions to the present noise lands are expected if the expansion of the present facility is undertaken. Thus there will be no additional infringement on the environmental quality of the area.

AIRPORT BOUNDARY

EXISTING RUNWAY

PROPOSED RUNWAY

REDUCTION OF CNR CONTOURS

WITH TORONTO II SPLIT

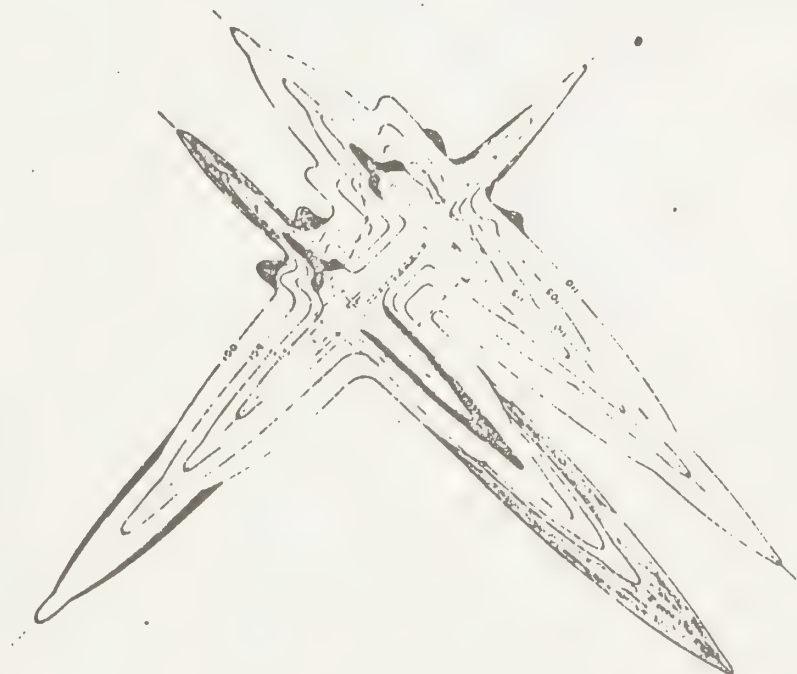
REDUCTION OF 100 CNR CONTOUR

REDUCTION OF 115 CNR CONTOUR

TIA. MALTON

COMPOSITE NOISE

RATING CONTOURS



6

9000 10000 11000 12000 13000 14000 15000 16000 17000 18000 19000 20000 21000 22000 23000 24000 25000 26000 27000 28000 29000 30000 31000 32000 33000 34000 35000 36000 37000 38000 39000 40000 41000 42000 43000 44000 45000 46000 47000 48000 49000 50000 51000 52000 53000 54000 55000 56000 57000 58000 59000 60000 61000 62000 63000 64000 65000 66000 67000 68000 69000 70000 71000 72000 73000 74000 75000 76000 77000 78000 79000 80000 81000 82000 83000 84000 85000 86000 87000 88000 89000 90000 91000 92000 93000 94000 95000 96000 97000 98000 99000 100000

ESTIMATED AIR FREIGHT TRAFFIC
(CARGO AND MAIL)

YEAR	Low Forecast (a)	% INCREASE	High Forecast (b)	% INCREASE
	(000's) (TONS)		(000's) (TONS)	
1976	250		250	
1980	490	96		
1985	1,050	114.3		
1990	2,175	107.1	2,675	
2000	9,570	340.0	16,275	508.41

TOTAL OUTBOUND FREIGHT TO AIRPORT

Daily No. of vehicles (1970) - 882

455 autos

427 trucks

Average consignment per auto - 3.58

consignment per truck - 8.05

Four prime areas of origin and delivery

(a) Toronto C.B.D.

(b) Airport environs

(c) Oakville, Burlington

(d) East Toronto

Lowest estimate of 1990 - airport cargo vehicles
= 13,200 per day

3 1761 11546345 7

